

II. Remarks

Reconsideration and allowance of the subject application are respectfully requested.

Claims 17-31 and 33-41 are pending in the application. Claims 17, 20, 30, and 31 are independent.

Claims 17-41 were rejected under 35 U.S.C. § 103(a), as being unpatentable over EPO 0644030A2 ("Arai") in view of Louwagie, for the reasons noted at page 3 of the Office Action. Applicants respectfully traverse all art rejections.

Arai addresses the problem of maintaining accurate pressure control feedback measurements (in a hydraulic circuit) that are otherwise effected by variations in environmental variables (e.g. temperature etc.). The solution requires a correction value computing unit and associated memory to calculate and store pressure reading correction values that are used to constantly update a calibration reference or zero point.

Louwagie and 6,182,019, both commonly assigned to Rosemount Inc., disclose a tightly integrated process instrumentation device that is intended to be directly coupled to the process apparatus (e.g. pipe) and includes multiple process measurement devices (e.g. pressure, temperature, flow, etc.) and related signal processing and communications circuitry, the device may further include a module with a processing structure

for calculating any desired process property (e.g. mass flow rate), and for storage and/or transmission of the calculated data to a remote controller. The problem addressed was in the integration of the processing structure whereas it had been previously handled remotely.

By contrast, in accordance the various aspects of the present invention, the problem addressed was the provision of a control architecture that includes a local processor for generating control signals for controlling an analog device. In particular, the present invention provides a control architecture with a processor, disposed adjacent a hydraulic manifold or a hydraulic actuator, that supports real-time closed-loop control of the hydraulic actuators of an injection molding machine with vastly improved control thereof.

Applicants respectfully submit that Arai and Louwagie, whether taken alone or in combination, do not provide a solution to the problem solved by the present invention. In particular, neither Arai nor Louwagie provide a control architecture including a local processor that is **capable of generating control signals for analog devices**. There is no suggestion in Arai that the control architecture is in any way uncommon other than for the improvements made to the calibration circuit. And, the processing structure according to Louwagie is intended simply for evaluating a process property for storage or transmission to a remote controller, and is clearly not intended for evaluating

control signals for analog devices.

Hence, in view of the pending claims, neither Arai nor Louwagie (nor their combination) discloses the novel nonobvious combinations of structure and function set forth in the claims, including at least:

- <Claim 17> ...a processor, disposed adjacent at least one of (i) said manifold, and (ii) at least one of said plurality of valves, and being coupled to one or more each of said plurality of valves and to said system control processor, said processor storing a control program for at least one each of said plurality of hydraulic actuators, **said processor controlling said one or more of said plurality of valves** based on the stored control programs and command signals received from said system control processor.
- <Claim 20> ... **calculating, in the microcontroller, control signals to control the valve to cause movement of the hydraulic controller**, said microcontroller being capable of calculating the control signals based on one or more of the feedback signals, the command signals, and the stored control program; and transmitting the control signals to the controllable valve.
- <Claim 30> ...a processor for (i) receiving feedback signals

from the feedback sensor, (ii) determining operational data from the multi-dimensional data stored in the memory based on the received feedback signals, **(iii) generating control signals** by applying an inverse function to the operational data to control for nonlinear characteristics of the hydraulic actuator, and (iv) outputting the control signals to the valve.

- <Claim 31> ...a microcontroller, disposed adjacent the valves, which **controls said first valve and said second valve** to provide profiling of one of (i) pressure and (ii) flow into and out of the hydraulic actuator.

Accordingly, the salient claimed features of the present invention are nowhere disclosed or suggested by the cited art, whether that art is taken individually or in combination.

In view of the above remarks, it is believed that this application is now in condition for allowance, and a Notice thereof is respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 625-3500. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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